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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,641	04/21/2004	James C. Withers	MER 03.01	5332
27667	7590	10/03/2007		
HAYES SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718			EXAMINER ROE, JESSEE RANDALL	
			ART UNIT 1742	PAPER NUMBER
			MAIL DATE 10/03/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/828,641

Applicant(s)

WITHERS ET AL.

Examiner

Jessee Roe

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) 16, 26, 28-29, 32-45, 47-53, 81-84, 86 and 106-109 is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 11, 12, 54-55, 58-61, 64-66, 76, 77, 85, 89-95 and 110-119 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of the Claims

Claims 1, 11-12, 16, 26, 28-29, 32-45, 47-55, 58-61, 64-66, 76-77, 81-86, 89-95, and 106-119 are pending wherein claims 1 and 66 are amended; claims 16, 26, 28-29, 32-45, 47-53, 81-84, 86, and 106-109 are withdrawn; claims 2-10, 13-15, 17-25, 27, 30-31, 46, 56-57, 62-63, 67-75, 78-80, 87-88, and 96-105 are canceled; and claims 110-119 are new.

Status of Previous Rejections

The previous rejection of claims 1, 11, 66, 76, 89-92 and 93-95 under 35 U.S.C. 103(a) as being unpatentable over Dean et al. (US 2,909,473) in view of Cass (US 4,931,213) is withdrawn in view of the Applicant's amendments to the claims. The previous rejection of claims 12 and 77 under 35 U.S.C. 103(a) as being unpatentable over Dean et al. (US 2,909,473) in view of Cass (US 4,931,213), and further in view of Rand (US 2,939,823) is withdrawn in view of the Applicant's amendment to the claims. The previous rejection of claims 54-55 and 60-61 are withdrawn in view of the Applicant's arguments. The previous rejections of claims 54-55 and 58-59 under 35 U.S.C. 103(a) as being unpatentable over Slatin (US 2,994,650) in view of Kroll (The Production of Ductile Titanium), and further in view of Cass (US 4,931,213) is withdrawn in view of the Applicant's arguments. The previous rejections of claims 1, 11-12, 60-61 and 64-65 under 35 U.S.C. 103(a) as being unpatentable over Slatin (US 2,994,650) in

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view of Kroll (The Production of Ductile Titanium), and further in view of Cass (US 4,931,213) is withdrawn in view of the Applicant's arguments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 11-12, 54-55, 60-61, 66, 76-77, 89, 93, 110-114 and 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al. (WO 99/64638) alone, or alternatively in view of Westfall (US 5,215,631).

In regards to claims 1, 11-12, 54-55, 60-61, 66, 76-77, 110-114, Fray et al. (WO '638) discloses a method for the production of titanium metal from any initial form (pg. 6, lines 16-25) which comprises electrochemically reducing, in eutectic molten salt electrolytes including calcium chloride and lithium chloride (pg. 8 – pg. 9, line 4), a metal compound of the form M^1X wherein X would be oxygen, sulfur, carbon, or nitrogen and M^1 would be metals such as titanium, silicon, germanium, zirconium, hafnium, samarium, uranium, aluminum, magnesium, neodymium, molybdenum, chromium, niobium, or alloys thereof (pgs. 17-18). Because substoichiometric titanium dioxide/titanium carbide would not be excluded by the method disclosed by Fray et al. (WO '638), it would have been obvious to one of ordinary skill in the art at the time the

invention was made to apply substoichiometric titanium dioxide/titanium carbide to the method as disclosed by Fray et al. (WO '638) with expected success.

Westfall ('631) discloses adding concentrated HCl to molten salt electrolytes such as potassium chloride, sodium chloride, lithium chloride (col. 30, line 1). Adding concentrated HCl accelerates the reduction reaction and eutectic mixtures allow for lower melting temperature of the electrolyte (col. 9, lines 26-43 and col. 31, lines 5-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method for the production of titanium metal, as disclosed by Fray et al. (WO '638), by using concentrated HCl and molten salt electrolytes, as disclosed by Westfall ('631), in order to accelerate the reduction reaction and lower the melting temperature of the electrolyte, as disclosed by Westfall ('631) (col. 9, lines 26-43 and col. 31, lines 5-17).

Still regarding claims 66, 76-77, Fray et al. (WO '638) suggest forming powder (particulate) final product (Example 8).

In regards to claim 89, the Examiner asserts that TiO would be included among metalloids of titanium and oxygen with titanium having a +2 charge.

In regards to claim 93, the Examiner asserts that Ti_2O_3 would be included among metalloids of titanium and oxygen with titanium having a +3 charge.

Claims 58-59 and 64-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al. (WO 99/64638), or alternatively in view of Westfall (US 5,215,631) as applied to claim 54 above, and further in view of Steinberg (US

2,792,310).

In regards to claims 58-59 and 64-65, Fray et al. (WO '638), or alternatively in view of Westfall ('631) discloses a method for the production of titanium metal as shown above, but Fray et al. (WO '638) does not specify the ratio of titanium, oxygen, and carbon.

Steinberg ('310) discloses, in the same field of endeavor, that the specific proportions of titanium, carbon, and oxygen would be result-effective in achieving a titanium metal product that would be free from unreduced oxides and carbides (purity) (pg. 1, col. 1, lines 20-40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the relative proportions of titanium, carbon, and oxygen, as disclosed by Steinberg ('310), in the method of producing titanium metal, as disclosed by Fray et al. (WO '638), or alternatively in view of Westfall ('631), in order to achieve a desired titanium metal purity, as disclosed by Steinberg ('310).

Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ward Fray et al. (WO 99/64638), or alternatively in view of Westfall (US 5,215,631), as applied to claim 60 above, and further in view of the ASM Handbook Volume 7.

Fray et al. (WO '638) disclose a process for the production of titanium metal from any desired form as shown above (which would include a sintered product), but Fray et al. (WO '638) do not specify that the article would be sintered in an inert atmosphere.

The ASM Handbook Volume 7 discloses that titanium would be sintered in a

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vacuum or inert gas atmosphere in order to prevent the formation of additional oxides (pg. 500, col. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply an inert gas atmosphere, as disclosed by the ASM Handbook Volume 7, when sintering titanium in the method for producing titanium metal, as disclosed by Fray et al. (WO '638), or alternatively in view of Westfall ('631), in order to prevent the formation of additional oxides, as disclosed by the ASM Handbook Volume 7 (pg. 500, col. 1).

Claims 89-95 and 114-119 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fray et al. (WO 99/64638), or alternatively in view of Westfall (US 5,215,631) as applied to claims 66 and 112 above, and further in view of Slatin (US 3,137,641).

In regards to claims 89-95 and 114-119, Fray et al. (WO '638), or alternatively in view of Westfall ('631) discloses a method for the production of titanium metal as shown above, but Fray et al. (WO '638) does not specify the concentration of Ti^{+2} and Ti^{+3} compounds in the electrolyte.

Slatin ('641) discloses, in the same field of endeavor, that the concentration of Ti^{+2} and Ti^{+3} compounds in the electrolyte would be result-effective in the formation of the titanium deposit in addition to the efficiency and capacity of the cell (pg. 1, col. 1, line 65 – pg. 2, col. 2, line 11).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the concentration of Ti^{+2} and Ti^{+3} compounds,

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as disclosed by Slatin ('641), in the method of producing titanium metal, as disclosed by Fray et al. (WO '638), or alternatively in view of Westfall ('631), in order to achieve a desired formation of the titanium deposit and optimize the efficiency and capacity of the cell, as disclosed by Slatin ('641) (pg. 1, col. 1, line 65 – pg. 2, col. 2, line 11).

Claims 1, 11-12, 54-55, 60-61 and 110-111 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward Close et al. (US 2003/0057101), or alternatively in view of Westfall (US 5,215,631).

In regards to claims 1, 11-12, 54-55, 60-61, 66 and 76-77, Ward Close et al. ('101) discloses a method for the production of titanium metal from granules or a sintered form which comprises electrochemically reducing, in molten salt electrolytes such as electrolytes of all common alkali and alkaline earth metals, a metal compound of the form M_1X , wherein X would be oxygen, sulfur, carbon, or nitrogen and M_1 would be a Group IVA element such as titanium, silicon, germanium, zirconium, hafnium, samarium, neodymium, molybdenum, chromium, niobium, or an alloy thereof [0018 – 0022]. Ward Close et al. ('101) further disclose production of the feedstock by addition of binder to rutile [0004] and [0018]. Because substoichiometric titanium dioxide/titanium carbide would not be excluded by the method disclosed by Ward Close et al. ('101), it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply substoichiometric titanium dioxide/titanium carbide to the method as disclosed by Ward Close et al. ('101) with expected success.

Westfall ('631) discloses adding concentrated HCl to molten salt electrolytes such as potassium chloride, sodium chloride, potassium chloride (col. 30, line 1).

Adding concentrated HCl accelerates the reduction reaction and eutectic mixtures allow for lower melting temperature of the electrolyte (col. 9, lines 26-43 and col. 31, lines 5-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method for the production of titanium metal, as disclosed by Ward Close et al. ('101), by using concentrated HCl and molten salt electrolytes, as disclosed by Westfall ('631), in order to accelerate the reduction reaction and lower the melting temperature of the electrolyte, as disclosed by Westfall ('631) (col. 9, lines 26-43 and col. 31, lines 5-17).

In regards to claim 89, the Examiner asserts that TiO would be included among metalloids of titanium and oxygen with titanium having a +2 charge.

In regards to claim 93, the Examiner asserts that Ti_2O_3 would be included among metalloids of titanium and oxygen with titanium having a +3 charge.

Claims 58-59 and 64-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ward Close et al. (US 2003/0057101), or alternatively in view of Westfall (US 5,215,631), as applied to claims 54 and 60 above, and further in view of Steinberg (US 2,792,310).

In regards to claims 58-59 and 64-65, Ward Close et al. ('101) discloses a method for the production of titanium metal as shown above, but Fray et al. (WO '638) does not specify the ratio of titanium, oxygen, and carbon.

Steinberg ('310) discloses, in the same field of endeavor, that the specific

proportions of titanium, carbon, and oxygen would be result-effective in achieving a titanium metal product that would be free from unreduced oxides and carbides (purity) (pg. 1, col. 1, lines 20-40).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the relative proportions of titanium, carbon, and oxygen, as disclosed by Steinberg ('310), in the method of producing titanium metal, as disclosed by Ward Close et al. ('101), or alternatively in view of Westfall ('631), in order to achieve a desired titanium metal purity, as disclosed by Steinberg ('310).

Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ward Close et al. (US 2003/0057101), or alternatively in view of Westfall (US 5,215,631), as applied to claim 60 above, and further in view of the ASM Handbook Volume 7.

Ward Close et al. ('101) disclose a process for the production of titanium metal from sintered form as shown above, but Ward Close et al. ('101) do not specify that the article would be sintered in an inert atmosphere.

The ASM Handbook Volume 7 discloses that titanium would be sintered in a vacuum or inert gas atmosphere in order to prevent the formation of additional oxides (pg. 500, col. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply an inert gas atmosphere, as disclosed by the ASM Handbook Volume 7, when sintering titanium in the method for producing titanium metal, as disclosed by Ward Close et al. ('101), or alternatively in view of Westfall ('631), in order to prevent the formation of additional oxides, as disclosed by the ASM

Handbook Volume 7 (pg. 500, col. 1).

Response to Arguments

Applicant's arguments with respect to claims 1, 11-12, 54-55, 58-61, 64-66, 76-77, 89-95, and 110-119 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571) 272-5938. The examiner can normally be reached on Monday-Friday 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JR

ROY KING
SUPERVISORY PATENT ENGINEER
TECHNOLOGY CENTER 1100

Continuation of Disposition of Claims: Claims pending in the application are 1,11,12,16,26,28,29,32-45,47-55,58-61,64-66,76,77,81-86,89-95 and 106-119.